

REMARKS

Applicant requests favorable reconsideration and allowance of this application in view of the foregoing amendments and the following remarks.

Claims 1, 3, 5, 8-11, 13, 16, 18, and 29 are now pending in the application, with Claims 1, 18 and 29 being independent. Claims 6 and 7 have been cancelled without prejudice.

Claims 1, 5, 8, 9, 18, and 29 have been amended. Applicant submits that support for the amendments can be found in the original disclosure, and therefore no new matter has been added.

Initially, Applicant's representative wishes to thank the Examiner for the courtesies extended during the personal interview of February 25, 2004. During the interview, it was agreed to amend the claims in the manner herein. As discussed, the changes were made merely to improve the form of the claims and clarify their scope. The changes are not believed to raise any substantial new issues. Also during the interview, Applicant's representative presented patentability arguments, which will be summarized below.

Claims 1, 3, 5-11, 13, 16, 18, and 29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,846,134 (Latypov) in view of U.S. Patent No. 5,913,727 (Ahdoot), U.S. Patent No. 5,488,362 (Ullman, et al.) and U.S. Patent No. 5,930,741 (Kramer). Applicant respectfully traverses this rejection for the reasons discussed below.

As recited in independent Claim 1, the present invention relates to a user interface apparatus. The apparatus includes a first sensor, a second sensor, an estimating

unit, a generation unit, a determination unit and an image generating unit. The first sensor is attached to a first portion of a body of a user. The first portion is a head and the first sensor detects a position and an orientation of the head. The second sensor is attached to a second portion of the user, which is different from the first portion. The estimating unit is arranged to estimate a relative position of the second portion with respect to the position and orientation of the first portion in accordance with results of detection by the first and second sensors. The generation unit is arranged to generate action information on the basis of a transition of the estimated relative position. The determination unit is arranged to determine a user instruction corresponding to the generated action information. The image generating unit is arranged to generate an image on the basis of the user instruction.

As recited in independent Claim 18, the present invention relates to a user interface method for outputting a user instruction to a predetermined apparatus or program. The method includes a step of detecting a location of a first portion of a body of a user and a location of a second portion of the user, which is different from the first portion, by using first and second sensors attached to the user. The first portion is a head and the first sensor detects a position and an orientation of the head. The method further includes a step of estimating a relative position of the second portion with respect to the position and orientation of the first portion in accordance with results of detection by the first and second sensors in the detecting step, a step of generating action information on the basis of a transition of the estimated relative position and a step of determining a user instruction corresponding to the generated action information and outputting the determined user instruction to the apparatus or program.

As recited in independent Claim 29, the present invention relates to a computer readable storage medium, which stores a program of a user interface method for outputting a user instruction to a predetermined apparatus or program. The medium stores a program step of detecting a location of a first portion of a body of a user and a location of a second portion of the user, which is different from the first portion, by using first and second sensors attached to the user, where the first portion is a head and the first sensor detects a position and an orientation of the head, a program step of estimating a relative position of the second portion with respect to the position and orientation of the first portion in accordance with results of detection by the first and second sensors in the program step of detecting, a program step of generating action information on the basis of a transition of the estimated relative position and a program step of determining a user instruction corresponding to the generated action information and outputting the determined user instruction to the apparatus or program.

Considering the position and orientation (or posture) of a user's head is quite important in a user interface to which the present invention is directed. For example, the line-of-sight direction of the user is very important in the user interface as well as the relative positions of body parts with respect to the line-of-sight direction of the user. Referring to Fig. 9 and its corresponding discussion in the specification, a relative position of a hand with respect to the line-of-sight direction is important in that shooting would be difficult and inaccurate if a shooting direction is different from the line-of-sight direction of the user in a shooting operation. Thus, estimating a relative position of a second portion with respect to the position and orientation of a first portion (a head) is important for the performance of the claimed user interface and user interface method recited in the claims.

In Latypov, only the positions of the foot and hand of user 3 are detected by sensors 10, 13 and receiver 11. The orientation of the head is not detected. Moreover, Latypov does not estimate a relative position of a second portion with respect to a position and orientation of a first portion.

Ahdoot describes an interactive simulation game in which position sensing means 30 are provided on the user at various locations including the head and hand. Ahdoot does not detect a position and orientation of a head and does not estimate a relative position of a second portion with respect to the position and orientation of the head.

Ullman, et al. describes a hand attachment for controlling a video game to detect when a user's hand is in a specific pose. There is not disclosure or suggestion of detecting a position and orientation of a head.

Thus, Latypov, Ahdoot and Ullman, et al. fail to disclose or suggest a first sensor detecting a position and an orientation of a head and a unit or step of estimating a relative position of a second portion with respect to the position and orientation of a first portion (head), as is recited in independent Claims 1, 18 and 29.

Thus, these citations fail to disclose or suggest important features of the present invention recited in independent claims.

Kramer describes devices and methods to accurately detect movement of an entity. As understood by Applicant, Kramer can determine the true position of a body part by correcting a position value obtained by a fast device (which is not precise) with the position value obtained by a slow device (which is precise). However, Kramer does not estimate a relative position of a second portion with respect to a position and orientation of a first portion (head), as is recited in the independent claims.

Thus, Kramer fails to remedy the deficiencies of the citations noted above with respect to the independent claims.

In view of the foregoing, reconsideration and withdrawal of the § 103 rejection are requested.


For the foregoing reasons, Applicant respectfully submits that the present invention is patentably defined by independent Claims 1, 18 and 29. Dependent Claims 3, 5, 8-11, 13 and 16 are also allowable, in their own right, for defining features of the present invention in addition to those recited in their respective independent claims. Individual consideration of the dependent claims is requested.

This Amendment After Final Rejection is an earnest attempt to advance prosecution and reduce the number of issues, and is believed to clearly place this application in condition for allowance. This Amendment was not earlier presented because Applicant earnestly believed that the prior Amendment placed the subject application in condition for allowance. Accordingly, entry of this Amendment under 37 CFR 1.116 is respectfully requested.

For the foregoing reasons, Applicant submits that this application is in condition for allowance. Favorable reconsideration, withdrawal of the rejection set forth in the above-mentioned Office Action, and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, DC office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,


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